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FRIDAY, MAY 16, 1919

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SCIENCE

FRIDAY, MAY 16, 1919

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METHODS OF SECURING BETTER CO-OPERATION BETWEEN GOVERNMENT AND LABORATORY ZOOLOGISTS IN THE SOLUTION OF PROBLEMS OF GENERAL OR NATIONAL IMPORTANCE[1]

LET us admit at once that government bureaus have great difficulty in getting men trained for their work. Let us go further, and admit that government bureaus have practically, except for certain fundamentals, to train their own men. Let us acknowledge also that the men in charge of the biological laboratories of the universities of the country are ready and anxious to train their men to be of the greatest possible service to the country, and that this readiness and this anxiety have been intensified by the great crisis through which we have been and are still passing.

How is this to be brought about? Plainly by a very perfect understanding and sympathy between the men in charge of the government bureaus and the men in charge of the university laboratories.

Although this suggestion has been made a number of times (I made it myself twenty years ago in an address before the American

[1] A symposium before the American Society of Zoologists, held at Baltimore on December 26, 1918, Professor C. E. McClung presiding, included papers and discussions as follows: Representing the Bureau of Entomology, Dr. L. O. Howard. Discussion by J. G. Needham, representing the Bureau of Fisheries, Dr. Hugh M. Smith. Discussion of Dr. H. B. Ward. Representing the Bureau of Animal Industry, Dr. B. H. Ransom. Discussion by Dr. Herbert Osborn. Representing the Bureau of Biological Survey, Dr. E. W. Nelson. Discussion by Dr. R. K. Nabours. Relation of the Council of National Defense and the National Research Council to the Advancement of Research, Dr. John C. Merriam.

Society of Naturalists at Baltimore), this present discussion is, I hope, an emphatic and practical beginning of a definite movement which will bring results. It is primarily, perhaps, for the government men to point out the needs. They are now assured of the warm desire to cooperate on the part of the university men, and it is only by the closest cooperation that the best results can be secured. This involves more than mere suggestions from the government to the universities. It should mean a thorough knowledge on the part of the heads of the university laboratories of the intimate nature of the problems being studied and of the methods which are being adopted to solve these problems. Such a knowledge as this can best be gained by personal contact with the workers, and such contact should be of such a nature as to bring about not only suggestions to the teachers as to the best methods of training their men for future government work but also suggestions from the trained minds of the teachers as to other directions or means of attacking the problems which the government is trying to solve.

It would be an ideal arrangement if every highly trained laboratory man in the principal universities could be made a collaborator of some government scientific bureau and could be permitted and encouraged at government expense to visit for a longer or shorter time the different field laboratories of the government working in lines in which he himself is working, and thus bring about the personal knowledge and personal contact necessary for both lines of suggestion. Such an arrangement in a large way is probably impractical at present, but it might be started in a small way and in individual cases and will probably become eventually a fixed and valuable policy.

And now as to teaching and the training of workers, I don't know whether as a rule teachers have kept positive and relative values clearly in their own minds and in the minds of their students. Do they point out plainly the practical utilizations of zoology? Do they show their students the whole of the field that is open to the trained investigator, and do they make their teaching as broadly attractive as possible? Have they made enough use of the great out-of-doors? Are they utilizing to the full the educational help of the motion picture?

In general, a man coming from a university to that branch of the government service with which I am connected should be fundamentally sound in botany, chemistry and physiology, and he should have an acquaintance with the principal foreign languages in which the results of important work are published.

There is need, as my colleagues who are to speak for other government bureaus will readily admit, for several different types of men in the service—men who have been trained for different kinds of work—and this should be borne in mind in considering the following suggestions.

We need more training in taxonomy, that basic branch of zoology upon which all other work rests.

We need an infinite amount of investigation in the different tropisms, in behavior, in all ecological lines, and, considering relative values, forms should be chosen for such studies from among those species which have an important economic rank or from among very closely related forms. In many cases enormous time has been comparatively wasted from the want of recognition of the importance of this point.

There should be careful training in the planning of experiments, in the interpretation of results, in the collation of suggestive results, and in the preparation of reports. The average man coming from a university is wofully lacking in the latter training, and gains it with slow progress after entering the government service.

As to cooperative work between the universities and the government laboratories, in addition to the training of men by the former for service in the latter, there is much that can be done aside from this training and the possible official collaboration of certain teachers with traveling privileges hinted at in a former paragraph.

Constant suggestions might be made from the government laboratories to teachers concerning the lines of work that might be taken up by advanced students in preparation for theses which would fit in with general investigations being carried on by the government. It is extraordinary that such suggestions have not been asked for by teachers, or that they have not been made in considerable number by government men engaged in zoological work. I am informed by Dr. Alsberg that such a policy exists in regard to chemical problems and that the Bureau of Chemistry often assigns practical research problems to university men who have the laboratory facilities and the time to devote to research.

This naturally suggests the research fellowships which are beginning to be founded in certain universities by certain industrial organizations, and with this in mind the thought arises: Might not the government itself found fellowships at universities for the investigation of certain problems in applied science?

The laboratories of the larger universities are fitted out with costly and extensive apparatus which while existing doubtless in some of the government laboratories, are not duplicated in any number in field laboratories. Such apparatus as hydrographic machines, respirometers, calorimeters and others belonging to the university should, by collaboration, be used in practical government investigations. An admirable example of this kind of cooperation is the elaborate work on the wintering of bees which was done a few years ago at the University of Pennsylvania in collaboration with the Bureau of Entomology.

There is much that might be considered in this general way, and there are many specific things that occur to me, but which it will be undesirable to take the time to advance at present. Expecting that the approximate soundness of what has been said will be admitted, it seems to me that a practical step towards putting the whole matter on a cooperative basis will be to organize a permanent committee of government men in Washington, to whom definite suggestions can be sent by university and government workers and who can discuss these suggestions, arrange them in practical form, and distribute them where they can do the most good. Such a committee would therefore be a clearing house for ideas, and its opinion as to the value of the ideas and the best and most practical way of carrying them out would carry weight. Perhaps there should be associated with this committee and as members of it certain strong men from nearby university zoological laboratories.

I welcome most heartily the movement which has brought about this symposium and which bids fair to have results of much importance.

L. O. HOWARD

THE problems of national importance with which we are called upon to deal are doubtless those having to do with the biological needs of our species. These fall into three principal categories: Needs of food, needs of shelter, needs of defense.

These are the primary needs of all animals. Given proper physical conditions—suitable air, moisture, temperature, pressure, etc.—these are the matters in respect to which every species must make its own provision. Of these, food is the most insistent and everrecurrent need. Shelter is for our species a little different from that of other species, since it means for us clothing and housing of a very artificial sort. Defense also has grown different, though the categories of our natural enemies are the same. They are: (1) Enemies to be escaped, because of their superior powers; (2) enemies to be fought, there being a fighting chance to overcome them; (3) enemies to be dispersed, because individually insignificant; (4) enemies to be endured (at least until we have means for their control) because they are so small.

Invention has enabled us to cope with all our enemies save a few of the smallest of them. We have improved our fighting weapons until all the great beasts have been put

completely within our power, and our worst remaining enemies are those of our own species. The only needs of defense that Mother Nature imposed upon our species were needs of power to combat enemies of other species and to meet the rigors of our environment; all else is but a self-imposed burden.

I judge by the topics of this conference that it is the need of food that we are mainly called upon to consider. The conservation of food, through the control of insect destroyers of it, is a prime duty of Dr. Howard's bureau and of several others. So of food I shall speak. Years ago when writing a text-book of general biology, desiring to have said something when I got to the end of the first sentence, I wrote: "The primary demand of individual livelihood is for food;" and after a dozen or more years of subsequent reflection upon the subject, I think that that is about the most important biological statement I ever made.

Our species began by eating what Mother Nature provides ready made, as the animals eat. Such plant products as fruits, nuts, roots; such animal products as eggs and oysters, were at once available for consumption. But unlike the other species, we have vastly increased the range of our diet, first by the use of fire in cooking, and then by the care and cultivation of the more valuable food-producing species in agriculture. Thus the entire range of the world's organic food stuffs is becoming available for the use of our species, in a small part unmodified as in the beginning, in a larger part after milling and culinary treatment, and in by far the largest part, after several turnovers by biological agents. In this last direction we have made only a beginning. I regard it as the field most promising in results for future research.

Our food is fundamentally the same as that of animals, and many animals are competitors with us for the same supplies. Some of these animals, like rats and mice and cockroaches, having dietaries like our own and appreciating our shelter as well as our food stores, have gone all over the world with us and have become our permanent associates. Many others have settled in our fields where, by raising their food plants in mostly pure cultures, we have greatly improved the means of sustenance for them.

The pioneer when his fields became infested with pests could escape their competition for a time by opening new fields in another locality; but that was when land was plenty and men were few. Now, the land is filled. The people are here and must be fed. This is going to require that all the fields yield their full measure of increase every year, and that all that is raised be saved for human use. This then is one great national problem; to raise more food and to save what we raise from the ravage of competing species.

In the task of finding out the best means of accomplishing these needs, government and university biologists are colaborers. Their highest function, that of research, they have in common. They have, also, functions apart, that of the university being to train men for this work, and that of the government bureaus, to administer the work throughout the land. We are met here to consider the problem together, and to ask whether there are ways of making better progress through cooperation and mutual aid.

Dr. Howard's suggestions appear to be along two lines: Better training of men for the work; better facilities for exchange of experiences.

If the first seems to reflect on the training done in the universities, nevertheless it is a good suggestion and one that is always in order, and when it comes from so good a friend and so competent a critic of our work, accompanied by specific suggestions for improvement, it is more than welcome and we shall try to meet it. When he suggests in substance that we put the most important thing foremost, I am not sure that we will be able to agree with him or even with one another as to what is most important. It is important to give the student a good foundation in the fundamental sciences, for only on this may a superstructure of technical knowledge safely be reared. It is also necessary in this day of specialization to give as much

training as possible for particular lines of work. To the teachers of the fundamental sciences, the whole time of a college course seems inadequate for the first. To the specialist all the time seems required for the second. Both aims are proper aims but they are forever at variance. The course of study is always a compromise between the two; and the difficulties of making the compromise satisfactory grow with ever increasing knowledge. Yet human life is not appreciably lengthened, and the years that a youth may wholly devote to preparation for service are not increased. Probably some time may be gained for special training by more rigorous selection of materials for fundamental courses, by the limitation of the work of these to essentials, and by avoidance of duplication. This can be done and should be done.

Dr. Howard suggests that we give more time to taxonomy and ecology and less to physiology and genetics. This is a good suggestion. We are all out of balance. Some of our laboratories resemble up-to-date shops for quantity production of fabricated genetic hypotheses. Some of our publications make a prodigious effort to translate everything biological into terms of physiology and mechanism—an effort as labored as it is unnecessary and unprofitable. Why not let the facts speak for themselves? Our laboratories are full of fashions. They go from one extreme to another. In my high school days we learned systems of classification; in my college days we did nothing but dissecting; later came morphology and embryology, then experimental zoology, then genetics, and the devotees of each new subject have looked back upon the old with something like that disdain with which a debutante regards a last year's gown. Natural history and classification are perhaps long enough out of date, so that interest in them may again be revived. I hope so; for these are the phases of biology by means of which a youth is best oriented for more special work. Then, too, they are immensely practical. One has to deal with species, and must be able to recognize them; and all economic procedure is applied ecology.

As to the training of men for report making that Dr. Howard suggests, I am a bit more doubtful. There are reports and reports. For the making out of reports merely to comply with governmental red-tape, I do not care to train men. Experience is the only school for this. And as to the training needed for making reports of the results of investigation, it is often training in restraint that is most needed. I hope it is not training in the construction of imposing and impressive diagrams that Dr. Howard has in mind. I have seen some such at these meetings, built like a sky-scraper, and far harder to understand than the few simple facts they were intended to set forth and explain! I set but three requirements before students in my own laboratory: (1) Clear analysis of the subject matter, (2) simple drawings, (3) good English—and not too much of it.

After all, if Dr. Howard has to take men from the universities and train them on his job, I do not feel badly about it, nor wholly responsible. Indeed, if we in the universities do our best, as assuredly we will, I think this will always be so; and if it were not so I should know that Dr. Howard's work was dead, and making no further progress; for, faster than we can equip and organize our teaching to meet new needs, new methods will evolve and demands for help will spring up in unexpected places.

Now as to cooperation, Dr. Howard suggests that the government provide means whereby properly trained men from the university laboratories may visit the government field laboratories for the purpose of acquainting themselves with the work there going on. Nothing better could be devised to give that purpose and direction to our teaching that he desires. Nothing could do more to infuse new vigor into our work of research. It would result first of all in substituting for some of the puny problems of our laboratories of sickly forcing-house types, others of the robust field-grown type, to which a young man might give his time and labor without reserve, and without a question as to its usefulness and value. It would check the tendency

to congregate in a few popular marine laboratories, there to run and howl with the pack, and would lead to greater independence in our scientific spirit and work.

Over against this suggestion of something the government might well do, I would place a suggestion of something the universities might well do. In the interests of their own work and of keeping it abreast of the times, they might make provision for sending their investigators each year to meetings such as this one, and to all national meetings in the field of the sciences that they cultivate: I mean, pay their traveling expenses. It would cost comparatively little and would help to keep both men and institutions alive.

Such means of getting together would provide opportunities for the exchange of experience, for learning new methods and for getting help from fellow specialists.

After all, we need to realize that cooperation in research has its serious limitations. Real research is nearly always the work of individuals. Nature does not yield up her secrets to a crowd or even to a committee, but only to her humble devotee, when working alone and apart. When a man is found working at a problem for which he is well trained and well equipped and in which he has both faith and zeal, the best way to cooperate with that man is to let him alone and keep out of his road.

Cooperation is limited in advance to getting oriented, and getting equipped. But after a discovery of a fundamental nature has been made, then cooperation is needed to learn the limits of its application. Life is a complex of changing factors, and environment is a complex of instable conditions. A good method is often good only locally and under certain conditions. Especially in field work in entomology it needs to be tested out zone by zone and province by province; and the coperation of many hands in many places is needed to find its limitations, and its true economic value.

Let us meet and exchange experiences. Progress in knowledge usually depends on our ability to take a hint from nature, as to where to look and what to look for: and the hint we may often obtain from the work of another. Betterment of methods oftenest grows out of comparison of results. Let me assure Dr. Howard that laboratory men are not unmindful of the limitations of laboratory methods, nor unwilling to go out in the field and acquaint themselves with the scientific problems the work of the bureau has raised, nor indisposed to do all they can to help solve them.

J. G. Needham
Cornell University

THE NATIONAL RESEARCH COUNCIL

ORGANIZATION OF THE NATIONAL RESEARCH COUNCIL[1]

PREAMBLE

The National Academy of Sciences, under the authority conferred upon it by its charter enacted by Congress, and approved by President Lincoln on March 3, 1863, and pursuant to the request expressed in an Executive Order made by President Wilson on May 11, 1918, hereto appended, adopts the following permanent organization for the National Research Council, to replace the temporary organization under which it has operated heretofore.

ARTICLE I.—PURPOSE

It shall be the purpose of the National Research Council to promote research in the mathematical, physical and biological sciences, and in the application of these sciences to engineering, agriculture, medicine and other useful arts, with the object of increasing knowledge, of strengthening the national defense, and of contributing in other ways to the public welfare, as expressed in the executive order of May 11, 1918.

ARTICLE II.—MEMBERSHIP

Section 1. The membership of the National Research Council shall be chosen with the view of rendering the Council an effective federation of the principal research agencies

[1] Approved by the National Academy of Sciences at its meeting on April 30, 1919.

in the United States concerned with the fields of science and technology named in article I.

Section 2. The council shall consist of (1) Representatives of national scientific and technical societies; (2) representatives of the government, as provided in the executive order; (3) representatives of other research organizations and other persons whose aid may advance the objects of the council.

ARTICLE III.—DIVISIONS

Section 1. The council shall be organized in divisions of two classes: (A) Divisions dealing with the more general relations and activities of the council; (B) divisions dealing with related branches of science and technology.

Section 2. The initial constitution of the divisions of the council shall be as follows: (A) Divisions of General Relations: (1) Government Division, (2) Division of Foreign Relations, (3) Division of States Relations, (4) Division of Educational Relations, (5) Division of Industrial Relations, (6) Research Information Service. (B) Divisions of Science and Technology: (7) Division of Physical Sciences, (8) Division of Engineering, (9) Division of Chemistry and Chemical Technology, (10) Division of Geology and Geography, (11) Division of Medical Sciences, (12) Division of Biology and Agriculture, (13) Division of Anthropology and Psychology.

Section 3. The number of divisions and the grouping of subjects in article III., section 2, may be modified by the executive board of the National Research Council.

Section 4. The Divisions of General Relations shall be organized by the Executive Board of the National Research Council (article IV., section 2).

Section 5. To secure the effective federation of the principle research agencies in the United States, provided for in article II., a majority of the members of each of the Divisions of Science and Technology shall consist of representatives of scientific and technical societies, chosen as provided for in article V., section 2. The other members of the Division shall be nominated by the executive committee of the division, approved by the executive board of the National Research Council, and appointed in accordance with article V., section 4.

Section 6. The divisions of the council, with the approval of the executive board, may establish sections and committees, any of which may include members chosen outside the membership of the council.

ARTICLE IV.—ADMINISTRATION

Section 1. The affairs of each division shall be administered by a chairman, a vice-chairman and an executive committee, of which the chairman and the vice-chairman shall be ex-officio members; all of whom shall be elected annually by the division and confirmed by the executive board.

Section 2. The affairs of the National Research Council shall be administered by an executive board, of which the officers of the Council, the president and home secretary of the National Academy of Sciences, the president of the American Association for the Advancement of Science, the chairmen and vice-chairmen of the Divisions of Science and Technology, and the chairmen of the Divisions of General Relations shall be ex-officio members. The executive board may elect additional members, not to exceed ten in number, who, if not already members of the National Research Council, shall be appointed thereto, in accordance with article V., section 4.

Section 3. The officers of the National Research Council shall consist of a chairman, one or more vice-chairmen, a secretary and a treasurer, who shall also serve as members and officers of the executive board of the council.

Section 4. The officers of the National Research Council, excepting the treasurer, shall be elected annually by the executive board. The treasurer of the National Academy of Sciences shall be ex-officio treasurer of the National Research Council.

Section 5. The duties of the officers of the council and of the divisions shall be fixed by the executive board.

ARTICLE V.—NOMINATIONS AND APPOINTMENTS

Section 1. The government bureaus, civil and military, to be represented in the government division, and the scientific and technical societies, to be represented in the Divisions of Science and Technology of the National Research Council, shall be determined by joint action of the council of the National Academy of Sciences and the executive board of the National Research Council.

Section 2. Representatives of scientific and technical societies shall be nominated by the societies, at the request of the executive board, and appointed by the president of the National Academy of Sciences to membership in the council and assigned to one of its divisions.

Section 3. The representatives of the governments shall be nominated by the president of the National Academy of Sciences after conferences with the secretaries of the departments concerned, and the names of those nominated shall be presented to the President of the United States for designation by him for service with the National Research Council.

Section 4. Other members of the council shall be nominated by the executive committees of the divisions, approved by the executive board, and appointed by the president of the National Academy of Sciences to membership and assigned to one of the divisions.

Section 5. Prior to the first annual meeting of the council following January 1, 1919, all divisions shall be organized by appointment of their members in accordance with article II. and article V., sections 1 to 4.

Section 6. As far as practicable one third of the original representatives of each scientific and technical society and approximately one third of the other original members of each of the divisions of science and technology shall serve for a term of three years; one third for a term of two years, and one third for a term of one year, their respective terms to be determined by lot. Each year thereafter, as the terms of members expire, their successors shall be appointed for a period of three years.

Section 7. The government representatives shall serve for periods of three years, unless they previously retire from the government office which they represent, in which case their successors shall be appointed for the unexpired term.

Section 8. As far as practicable a similar rotation shall be observed in the appointment of the members of the Divisions of General Relations.

ARTICLE VI.—MEETINGS

Section 1. The council shall hold one stated meeting, called the annual meeting, in April of each year, in the city of Washington, on a date to be fixed by the executive board. Other meetings of the council shall be held on call of the executive board.

Section 2. The executive board and each of the divisions shall hold an annual meeting, at which officers shall be elected, at the time and place of the annual meeting of the council, unless otherwise determined by the executive board, and such other meetings as may be required for the transaction of business.

Section 3. Joint meetings of the executive board of the National Research Council and the council of the National Academy of Sciences shall be held from time to time, to consider special requests from the government, the selection of organizations to be represented in the National Research Council, and other matters which, in the judgment of the president of the National Academy, require the attention of both bodies.

ARTICLE VII.—PUBLICATIONS AND REPORTS

Section 1. An annual report on the work of the National Research Council shall be presented by the chairman to the National Academy of Sciences, for submission to Congress in connection with the annual report of the president of the academy.

Section 2. Other publications of the National Research Council may include papers, bulletins, reports and memoirs, which may appear in the *Proceedings* or *Memoirs* of the

National Academy of Sciences, in the publications of other societies, in scientific journals, or in a separate series of the Research Council.

MEMBERSHIP OF DIVISIONS

MEMBERS of divisions of the National Research have been appointed as follows:

DIVISION OF PHYSICAL SCIENCES

Chairman: C. E. Mendenhall.

Acting Chairman until June 30: A. O. Leuschner.

Executive Committee: C. E. Mendenhall, *Chairman,* William Bowie, A. O. Leuschner, *Acting Chairman,* R. A. Millikan, H. N. Russell E. B. Wilson.

Representatives of Societies—American Astronomical Society: W. W. Campbell, H. N. Russell, Joel Stebbins. *American Physical Society:* H. A. Bumstead, William Duane, Irving Langmuir, Ernest Merritt, R. A. Millikan, E. B. Wilson. *American Mathematical Society:* E. W. Brown, L. E. Dickson, H. S. White.

Members at Large, nominated by the division: J. S. Ames, L. A. Bauer, William Bowie, Henry Crew, C. F. Marvin, Max Mason, M. I. Pupin, S. W. Stratton, A. Trowbridge.

DIVISION OF ENGINEERING

Chairman: Henry M. Howe.

Vice-chairman and acting chairman: Galen H. Clevenger.

Executive Committee: Henry H. Howe, *chairman,* Comfort A. Adams, Galen H. Clevenger, *vice-chairman,* D. S. Jacobus, E. G. Spilsbury.

Representatives of Societies—American Society of Mechanical Engineers: Arthur M. Greene, W. F. Goss,[1] D. S. Jacobus.[1] *American Institute of Electrical Engineers:* Comfort A. Adams, F. B. Jewett,[1] W. R. Whitney. *American Institute of Mining Engineers:* Hennon Jennings, Philip N. Moore, Joseph W. Richards.[1] *American Society of Civil Engineers:* Anson Marston, H. H. Porter,[1] George S. Webster. *American Society for Testing Materials:* A. A. Stevenson. *American Society of Illuminating Engineers:* Edward P. Hyde. *Western Society of Engineers:* Arthur N. Talbot. *Society of Automotive Engineers:* Charles F. Kettering.

Members at Large, nominated by the division: Henry M. Howe, Galen H. Clevenger, Edward Dean Adams,[1] John J. Carty, Gano Dunn, Van H. Manning, Charles F. Rand,[1] E. G. Spilsbury, Bradley Stoughton,[1] S. W. Stratton, Ambrose Swasey, William R. Walker.

[1] Member of Engineering Foundation.

DIVISION OF CHEMISTRY AND CHEMICAL TECHNOLOGY

Acting chairman until June 30: E. W. Washburn.

Chairman, July 1, 1919 to June 30, 1920: W. D. Bancroft.

Vice-chairman: Julius Stieglitz.

Executive Committee: E. W. Washburn, *Acting chairman,* W. D. Bancroft, *Chairman-elect,* Julius Stieglitz, *Vice-chairman,* A. B. Lamb, A. A. Noyes, C. L. Alsberg.

Representatives of Societies—American Chemical Society: C. L. Alsberg, W. D. Bancroft, C. G. Derick, J. M. Francis, E. C. Franklin, W. F. Hillebrand, John Johnston, Julius Stieglitz, J. E. Teeple. *American Electrochemical Society:* Colin G. Fink. *American Institute of Chemical Engineers:* Hugh K. Moore. *American Ceramic Society:* Albert V. Bleininger. *Members at large, nominated by the division:* C. H. Herty, G. A. Hulett, A. B. Lamb, A. A. Noyes, C. L. Parsons, E. W. Washburn.

DIVISION OF GEOLOGY AND GEOGRAPHY

Vice-chairman and acting chairman: E. B. Mathews.

Executive Committee: E. B. Mathews, *Vice-chairman,* Isaiah Bowman, A. H. Brooks, J. M. Clarke, N. M. Fenneman, David White.

Representative of Societies—Association of American Geographers: W. M. Davis, N. M. Fenneman, J. Russell Smith. *American Geographical Society:* Isaiah Bowman. *Geological Society of America:* J. M. Clarke, Whitman Cross, R. A. Daly, H. E. Gregory, A. C. Lawson. *Paleontological Society:* T. Wayland Vaughan. *National Geographical Society:* Gilbert Grosvenor.

Members at Large, nominated by the division: Ralph Arnold, Eliot Blackwelder, A. H. Brooks, A. L. Day, Ellsworth Huntington, Douglas W. Johnson, E. B. Mathews, R. A. F. Penrose, Jr., David White.

DIVISION OF BIOLOGY AND AGRICULTURE

Chairman: C. E. McClung.

Vice-chairman: L. R. Jones.

Executive Committee: C. E. McClung, *Chairman,* L. R. Jones, *Vice-chairman,* I. W. Bailey, F. R. Lillie, G. R. Lyman, H. F. Moore, A. F. Woods.

Representatives of Societies—American Society of Agronomy: Charles V. Piper. *American Society of Bacteriologists:* Samuel C. Prescott. *Botanical Society of America:* William Crocker, A. S. Jones. *Ecological Society of America:* W. M. Wheeler. *American Society of Economic Entomologists:* P. J. Parrott. *Society of American Foresters:* Barrington Moore. *American Genetics Association:* G. N. Collins. *American Society for Horticultural Science:* U. P. Hedrick. *American Phytopathological Society:* G. R. Lyman. *Society of American Zoologists:* M. F. Guyer, F. R. Lillie, G. H. Parker.

Members-at-large, nominated by the division: I. W. Bailey, B. E. Livingston, C. E. McClung, C. F. Marbut, A. G. Mayor, H. F. Moore, J. R. Murlin, W. Osgood, A. F. Woods.

RESEARCH FELLOWSHIPS

The National Research Council announces its first appointments to national research fellowships in physics and chemistry. The fellowships are supported by the Rockefeller Foundation and the object of the National Research Council in maintaining a system of research fellowships is to promote fundamental research in physics and chemistry primarily in educational institutions of the United States. Fellowships are awarded to persons who have demonstrated a high order of ability in research for the purpose of enabling them to conduct investigations at educational institutions which make adequate provision for research in physics or chemistry. The National Research Council has received approximately forty applications. The following initial appointments have been made:

In Chemistry

F. R. Bichowsky, of Washington, D. C., A.B. (Pomona, '12), Ph.D. (California, '16). Physical chemist at the geophysical laboratory of the Carnegie Institute of Washington since 1916. Mr. Bichowsky plans to conduct researches at the University of California.

Emmett K. Carver, of New York City, A.B. (Harvard, '14), Ph.D. (Harvard, '17). Formerly assistant to the director of the Wolcott Gibbs Memorial Laboratory at Harvard; captain, Chemical Warfare Service, U. S. A.

W. H. Rodebush, Ph.D. (California, '17), at present research chemist for the United States Industrial Alcohol Company, of Baltimore, Md. Mr. Rodebush will conduct researches at the University of California on A Study of the Specific Heats and Other Properties of Substances at Low Temperatures.

In Physics

Leonard B. Loeb, of New York City, B.S. (Chicago, '12), Ph.D. (Chicago, '16). Formerly assistant physicist at the Bureau of Standards, Washington, D. C.; lieutenant, Aviation Service, U. S. A. Mr. Loeb will conduct his researches at the University of Chicago.

Robert A. Patterson, of Bristol, Connecticut, A.B. (Yale, '11), Ph.D. (Yale, '15). Formerly instructor in physics at Yale University; major, Field Artillery, U. S. A.

George P. Paine, of Madison, Wisconsin, A.B. (Harvard, '05), Ph.D. (Wisconsin, '18). Instructor in engineering mathematics, University of Wisconsin. Mr. Paine will conduct his researches at Harvard University and at Blue Hill Meteorological Observatory.

It is expected that additional appointments will be announced in the near future. The members and acting members of the Research Fellowship Board are as follows: Wilder D. Bancroft, Henry A. Bumstead, Simon Flexner, George E. Hale, Elmer P. Kohler, A. O. Leuschner, Robert A. Millikan, Arthur A. Noyes, E. W. Washburn.

THE INDUSTRIAL FELLOWSHIPS OF THE MELLON INSTITUTE[1]

The annual report of Director Raymond F. Bacon of the Mellon Institute of Industrial Research[2] records a general extension of the institute's activities during the past year.

[1] For previous reports on the status of the system of cooperation between science and industry in operation at the Mellon Institute, see Duncan, Science, N. S., Vol. XXXIX. (1914), 672; Bacon, *ibid.*, XLIII. (1916), 453; *ibid.*, XLV. (1917), 399; and Weidlein, *ibid.*, XLVII. (1918), 447.

[2] The full report is published in *J. Ind. Eng. Chem.*, 11, 371–374, 1919.

A LIST OF THE INDUSTRIAL FELLOWSHIPS IN OPERATION AT THE MELLON INSTITUTE ON MARCH 1, 1919

Numbers and Names of Industrial Fellowships	Industrial Fellows, Names and Degrees	Foundation Sums and Dates of Expiration
No. 117—window glass	(Fellow to be appointed).	$3,000 a year. Bonus: $2,000.
No. 127—collar	H. D. Clayton (B.A., Ohio State University).	$2,800 a year. June 14, 1919.
No. 129—illuminating glass	A. H. Stewart (B.A., Washington and Jefferson College).	$2,100 a year. October 1, 1919.
No. 145—soap	(Fellow to be appointed).	$2,000 a year.
No. 150—enameling	R. D. Cooke (M.S., University of Wisconsin).	$2,600 a year. April 1, 1919.
No. 151—leather belting	*P. G. McVetty* (M.E., Cornell University), Senior Fellow. R. H. Edson (B.A., Clark College).	$4,900 a year. April 1, 1919.
No. 152—refractories	*E. M. Howe* (M.S., University of Pittsburgh), senior fellow B. M. Burchfiel (B.A., Southwestern College). E. N. Jessop (B.S., University of Pittsburgh). S. M. Phelps (assistant).	$7,000 a year. May 1, 1919.
No. 153—canning	M. R. Daughters (M.A., University of Nebraska), (second fellow to be appointed).	$6,000 a year. May 1, 1919.
No. 154—paper	Howard Curtis (B.A., Washington and Jefferson College).	$2,175 a year. June 1, 1919.
No. 155—protected metals	J. H. Young (Ph.D., Ohio State University).	$3,000 a year. June 1, 1919.
No. 156—physiological research	K. K. Jones (M.S., Kansas State Agricultural College).	$4,000 a year. August 1, 1919.
No. 157—dental products	C. C. Vogt (Ph.D., Ohio State University).	$2,000 a year. July 1, 1919. Bonus: Royalty on sales.
No. 158—leather soling	C. B. Carter (Ph.D., University of North Carolina).	$3,500 a year. June 1, 1919.
No. 159—copper	C. L. Perkins (B.S., New Hampshire College). R. E. Sayre (M.S., University of Wisconsin).	$5,400 a year. July 1, 1919.
No. 160—oil	*W. F. Faragher* (Ph.D., University of Kansas), senior fellow. W. A. Gruse (Ph.D., University of Wisconsin).	$10,000 a year September 1, 1919. Bonus: $10,000.
No. 161—glass	R. R. Shively (Ph.D., University of Pittsburgh).	$4,000 a year. September 1, 1919.
No. 162—gas	*J. B. Garner* (Ph.D., University of Chicago), senior fellow. H. B. Heyn (B.S., University of Wisconsin).	$7,500 a year. September 15, 1919.
No. 163—aluminum	*E. O. Rhodes* (M.S., University of Kansas), senior fellow. R. B. Trusler (B.S., Syracuse University).	$6,500 a year. September 15, 1919.
No. 164—alloy	O. E. Harder (Ph.D., University of Illinois).	$3,500 a year. October 1, 1919.
No. 165—coffee	C. W. Trigg (B.S., University of Pittsburgh).	$2,250 a year. October 1, 1919. Bonus: 2 per cent. of gross profits.
No. 166—food container	F. W. Stockton (B.A., University of Kansas).	$5,000 a year. October 16, 1919.
No. 167—magnesia	M. S. Mason (M.S., University of Illinois). R. H. Heilman, assistant (University of Pittsburgh).	$6,000 a year. January 1, 1920.
No. 166—yeast	*Ruth Glasgow* (M.S., University of Illinois), senior fellow. Grace Glasgow (M.S., University of Illinois). G. S. Bratton (B.A., University of Tennessee). F. M. Hildebrandt (Ph.D., Johns Hopkins University). W. H. Randall, assistant (George Washington University).	$15,000 a year. November 1, 1919.

A LIST OF THE INDUSTRIAL FELLOWSHIPS IN OPERATION AT THE MELLON INSTITUTE ON MARCH 1, 1919
(*Continued*)

Numbers and Names of Industrial Fellowships	Industrial Fellows, Names and Degrees	Foundation Sums and Dates of Expiration
No. 169—copper	*G. A. Bragg* (B.S., University of Kansas), senior fellow. J. W. Schwab (B.S., University of Kansas).	$6,000 a year. November 1, 1919.
No. 170—household utilities	F. F. Rupert (Ph.D., Massachusetts Institute of Technology). E. R. Edson (B.A., Clark College).	$5,000 a year. November 1, 1919.
No. 171—asbestos	A. F. Shupp (Ph.D., University of Pittsburgh).	$3,500 a year. November 1, 1919.
No. 172—silicate	M. G. Babcock (M.S., Iowa State College).	$2,500 a year. December 1, 1919.
No. 173—fiber	J. D. Malcolmson (B.S., University of Kansas).	$3,000 a year. November 15, 1919.
No. 174—glycerine	R. K. Brodie (M.S., University of Chicago). Melvin DeGroote (B.Ch.E., Ohio State University).	$5,000 a year. November 15, 1919.
No. 175—light metals	P. V. Faragher (Ph.D., Massachusetts Institute of Technology).	$4,000 a year. December 1, 1919.
No. 176—fuel	J. G. Davidson (Ph.D., Columbia University).	$5,000 a year. January 1, 1920.
No. 177—toilet articles	(Fellow to be appointed.)	$3,500 a year.
No. 178—silverware	H. E. Peck (B.S., Clarkson Memorial College of Technology).	$2,500 a year. December 11, 1919.
No. 179—organic solvents	*L. M. Liddle* (Ph.D., Yale University), senior fellow. H. W. Greider (M.S., University of Kansas).	$5,600 a year. January 1, 1920.
No. 180—keratin	B. A. Stagner (Ph.D., University of Chicago).	$4,000 a year. January 1, 1920. Bonus: $5,000.
No. 181—synthetic resins	(Senior fellow to be appointed). A. E. Coxe (B.S., University of Chicago).	$5,000 a year. December 23, 1921.
No. 182—by-products recovery	Walther Riddle (Ph.D., University of Heidelberg). H. E. Gill, assistant (University of Pittsburgh).	$3,000 a year. January 1, 1920.
No. 183—A, organic synthesis	*G. O. Curme, Jr.* (Ph.D., University of Chicago), senior fellow. H. R. Curme (Ph.D., University of Pittsburgh). J. N. Compton (M.S., Columbia University). C. O. Young (Ph.D., University of Pittsburgh). E. W. Reid (M.S., University of Pittsburgh).	$32,400 a year. January 1, 1920.
No. 183—B, organic synthesis	*H. A. Morton* (Ph.D., University of Pittsburgh), senior fellow. C. J. Herrly (B.S., Pennsylvania State College).	
No. 184—coke	*F. W. Sperr, Jr.* (B.A., Ohio State University), advisory fellow. O. O. Malleis (M.S., University of Kansas). L. R. Office (B.S., Ohio State University). H. S. Davis (Ph.D., Harvard University).	$7,020 a year. January 1, 1920.
No. 185—insecticides	O. F. Hedenburg (Ph.D., University of Chicago).	$3,500 a year. January 1, 1920.
No. 186—fertilizer	H. H. Meyers (B.S., University of Pennsylvania).	$4,000 a year. January 5, 1920. Bonus: $5,000.
No. 187—glue	R. H. Bogue (M.S., Massachusetts Agricultural College).	$2,500 a year. January 5, 1920.
No. 188—distillation	David Drogin (M.S., University of Pittsburgh).	$3,000 a year. January 18, 1920.
No. 189—laundry	H. G. Elledge (M.S., University of Pittsburgh). Alice L. Wakefield, assistant (B.S., Margaret Morrison).	$5,000 a year. February 15, 1920.

A LIST OF THE INDUSTRIAL FELLOWSHIPS IN OPERATION AT THE MELLON INSTITUTE ON MARCH 1, 1919
(*Concluded*)

No. 190—bread	*H. A. Kohman* (Ph.D., University of Kansas), senior fellow.	$10,000 a year. March 1, 1921.
	Roy Irvin (M.S., University of Kansas).	Bonus: $10,000.
	R. J. Cross (B.A., Leland Stanford Jr. University).	
No. 191—fruit beverages	H. A. Noyes (M.S., Massachusetts Agricultural College).	$3,000 a year. March 1, 1920.

During the institute year March 1, 1918, to March 1, 1919, there was a marked growth in both the number of industrial fellowships in operation and the amounts subscribed for their support. At the present time there are 47 industrial fellowships, and 5 additional ones have been arranged for, to begin just as soon as the necessary laboratory space can be provided. Of these 47 industrial fellowships, 35 utilize the services of one research man on each fellowship (individual fellowships), while 12 have the intensive work, in each instance, of one or more investigators under the supervision of a senior fellow (multiple fellowships). Of these two types of industrial fellowships, 9 have been founded by associations of manufacturers and these association fellowships serve in all 2,700 company members.

The following table presents the number of industrial fellowships which have been founded in the institute from March to March of each year, 1911 to 1919; the number of industrial fellows (research chemists and engineers) who have been employed thereon; and the total amounts of money contributed for their maintenance by the industrial fellowship donors (industrialists and associations of manufacturers):

March to March	Number of Fellowships	Number of Fellows	Amounts Contributed
1911–1912	11	24	$ 39,700
1912–1913	16	30	54,300
1913–1914	21	37	78,400
1914–1915	21	32	61,200
1915–1916	36	63	126,800
1916–1917	42	65	149,100
1917–1918	42	64	172,000
1918–1919	47	77	238,245

The total amount of money contributed by industrial firms to the institute for the eight years ending March 1, 1919, was $919,745. During the eight years, the institute itself expended over $330,000 in taking care of overhead expenses—salaries of members of permanent staff and office force, maintenance of building, apparatus, etc.—in connection with the operation of the industrial fellowships. Besides this amount, the building and permanent equipment of the institute, which make it the most complete and modern industrial experiment station in the country, represent an investment of about $350,000.

The administration of the Mellon Institute is now constituted as follows: Raymond F. Bacon, Sc.D., director; Edward R. Weidlein, M.A., associate director; E. Ward Tillotson, Jr., Ph.D., assistant director; William A. Hamor, M.A., assistant director; David S. Pratt, Ph.D., assistant director; Harry S. Coleman, B.S., assistant director.

SCIENTIFIC EVENTS

MINERAL DEPOSITS IN THE UNITED STATES

THE Geological Survey has recently published as its Bulletin 660 its annual volume entitled "Contributions to Economic Geology (short papers and preliminary reports), 1917. Part I. Metals and Nonmetals Except Fuels." This bulletin contains 11 papers describing deposits of ores of iron, manganese, tin, antimony, lead, silver and gold in widely separated parts of the United States and deposits of greensand, clay, and strontianite. The shortage of manganese, which is used extensively in hardening steel, and the high prices resulting from its scarcity, caused the survey to examine undeveloped deposits in western Arkansas and in Shenandoah Valley, Va., the results of which are described in "Manganese Deposits of the Caddo Gap and De Queen quadrangles, Ark.," by H. D. Miser, and "Possibilities for Manganese Ore on Certain Un-

developed Tracts in the Shenandoah Valley, Va.," by D. F. Hewitt, G. W. Stose, F. J. Katz and H. D. Miser. The greensand deposits of the eastern United States are considered by G H. Ashley particularly with reference to their possible utilization as a source of potash, for their green color is due to their content of glauconite, a mineral that usually carries about 7 per cent. of potash, although the sands as a whole contain somewhat less of this useful alkali. An interesting paper on "Strontianit Deposits near Barstow, Cal.," by Adolph Knopf, forms part of the volume. Strontianite has been successfully used in the recovery of sugar from beet-sugar molasses, large quantities of the molasses being unavoidably produced in the manufacture of beet sugar. Among the mining districts described in this bulletin are the Cuyuna iron district, Minn., by E. C. Harder and A. W. Johnston; the Kings Mountain tin district, N. C. and S. C., by Arthur Keith and D. B. Sterrett; the northwestern part of the Garnet Range and the Dunklebery district, Mont., by J. T. Pardee; and the Arabia district, Nev., by Adolph Knopf.

The bulletin which consists of about 300 pages and contains a number of small maps and line illustrations, may be obtained on application to the Director, U. S. Geological Survey, Washington, D. C.

SUMMER BIOLOGICAL STATIONS

The University of Michigan will maintain its biological station for instruction and research for the eleventh session during the eight weeks from June 30 to August 22. This station is situated on the shores of Douglas Lake, near Pellston, Mich., about twenty miles northeast of Petoskey, in the famous summer playground of northern Michigan. It is, however, well isolated from the summer resorts and the resort crowds. The personnel of the teaching staff is as follows: In zoology, Professors La Rue and Welch, of the University of Michigan, Professor Frank Smith, of the University of Illinois, and Mr. Dayton Stoner, of the State University of Iowa; in botany, Professor Gates and Dr. Ehlers, of the University of Michigan, and Professor Quick, of De Pauw University. Courses are offered in entomology, ornithology, vertebrate zoology, ecology of invertebrate animals, systematic botany, plant ecology and plant anatomy, all but the last requiring a large amount of field work. Opportunity for investigation is offered to a limited number of investigators upon payment of nominal fees. For further information address George R. La Rue, director, the Biological Station, University of Michigan, Ann Arbor.

Dr. Raymond C. Osburn, head of the department of zoology and entomology in Ohio State University, has been appointed director of the Lake Laboratory. The 1919 session of the laboratory will be held from June 23 to August 2, a period of six weeks. The laboratory is now located at Put-in-Bay, Ohio, which is on an island in Lake Erie several miles from the mainland. It is easily reached by steamer from Cleveland, Sandusky and Detroit. Cooperation with the State Fish and Game Commission of Ohio during the 1918 session proved satisfactory to both the laboratory and the commission and the arrangement will be continued. A course on the fishes of Lake Erie will be given by Professor Osburn. Members of the staff will be Dr. F. H. Krecker, the acting director, Ohio State University, who will offer a course in animal ecology; Professor S. R. Williams, of Miami University, who is in charge of invertebrate morphology; Professor M. E. Stickney, of Denison University, who gives work in plant ecology, and Dr. Edna Mosher, who is in charge of entomology. Surveys made last summer showed that the region was exceptionally well suited to the requirements of the laboratory. The fauna and flora are abundant and offer a wide field for research along a number of important lines. Independent workers will be cordially welcomed and given laboratory accommodations without charge.

An illustrated booklet has recently been issued descriptive of the work and environment of the Iowa Lakeside Laboratory. This station was founded by alumni of the University of Iowa on Lake Okoboji in 1909.

Beginning with the summer of 1919 the work of the laboratory will be organized on a research basis, and only those prepared for independent work will be admitted. The laboratory will open June 23, continuing in session ten weeks and closing August 30. Any one interested in the work for the coming summer should address the director, Robert B. Wylie, of the University of Iowa, Iowa City, Iowa.

DISTINGUISHED SERVICE MEDALS

GENERAL PERSHING has awarded the Distinguished Service Medal to a number of medical officers including the following:

FRANCIS A. WINTER, Brigadier-General. As chief surgeon of the lines of communication, American Expeditionary Forces, from June to December, 1917, he organized medical units at the base ports and in camps in France. He established large supply depots from which medical supplies were distributed to the American Expeditionary Forces, and by keen foresight and administrative ability, made these supplies at all times available for our armies.

JOSEPH A. BLAKE, Colonel. As chief consultant for the district of Paris, and commanding officer of Red Cross Hospital, No. 2, he efficiently standardized surgical procedures especially in the recent methods of treating fractures. His remarkable talent has materially reduced the suffering and loss of life among our wounded.

GEORGE W. CRILE, Colonel. By his skill, researches and discoveries, he saved the lives of many of our wounded soldiers. His tireless efforts to devise new methods of treatment to prevent infection and surgical shock revolutionized Army surgery and met with the greatest success.

WILLIAM H. WILMER, Colonel. As surgeon in charge of medical research laboratories, air service, American Expeditionary Forces, since September, 1918, he has rendered most distinguished service. His thorough knowledge of the psychology of flying officers and the expert tests applied efficiently and intelligently under his direction have done much to decrease the number of accidents at the flying schools in France and have established standards and furnished indications which will be of inestimable value in all future work to determine the qualifications of pilots and observers. The data collected by him is an evidence of his ability, his painstaking care and of his thorough qualifications for the important work intrusted to him. The new methods, instruments and appliances devised under his direction for testing candidates for pilots and observers have attracted the attention and been the subject of enthusiastic comment by officers of the allied services, and will be one of great importance in promoting the safety and more rapid development of aerial navigation.

JOEL E. GOLDTHWAIT, Colonel. As a member of the medical corps he has, by his unusual foresight and organizing ability, made it possible to reclaim for duty thousands of men suffering from physical defects. He has thereby materially conserved for combat service a great number of men who would have been lost to the service.

THOMAS W. SALMON, Colonel. He has, by his constant tireless and conscientious work, as well as by his unusual judgment, done much to conserve manpower for active front line work. He was the first to demonstrate that war neurosis could be treated in advanced sanitary units with greater success than in base hospitals.

SCIENTIFIC NOTES AND NEWS

JOSEPH BARRELL, professor of structural geology at Yale University, died on May 4 from pneumonia and spinal meningitis, aged forty-nine years.

THE National Research Council announces the appointment of James Rowland Angell, dean of the faculties, and professor of psychology in the University of Chicago, as chairman of the council for the year commencing July 1, 1919. Dr. Angell succeeds Dr. George E. Hale, director of the Mount Wilson Solar Observatory of the Carnegie Institution of Washington, who has directed the affairs of the council during the war, and who resigned as chairman on April 30, to return to California. Dr. John C. Merriam, professor of paleontology in the University of California, who has been acting chairman of the council at various times, will direct its affairs until Dr. Angell assumes office in July.

AT a meeting of the Franklin Institute at Philadelphia on May 21, the presentation of the Franklin Medals will be made to Sir James Dewar, the distinguished English chemist, and to Major-General George Owen Squier, of the

United States Army. Major Squier will give an address on "Some aspects of the Signal Corps in the World War." The address will be illustrated by still and moving pictures showing signal corps activities in France, and a limited number of signal corps communication devices will be exhibited.

Dr. Albert Calmette, former director of the Institut Pasteur at Lille, now subdirector of the Institut Pasteur at Paris, has been elected an active member of the section on public hygiene and legal medicine of the Paris Academy of Medicine.

Dr. Archibald P. Knight, for twenty-seven years professor of physiology in Queen's University, Kingston, Ontario, plans to tender his resignation, but will retain his position until a successor is appointed.

Professor Dugald C. Jackson, of the Massachusetts Institute of Technology, has returned from France and has been discharged from the Army.

Dr. Tamiji Kawamura, of the Imperial University, Kyoto, Japan, author of a work on Japanese fresh-water biology, is spending the spring quarter in the department of zoology of the University of Illinois, studying the methods and equipment of animal ecology in the laboratory of Professor V. E. Shelford.

Dr. Joseph E. Pogue, formerly associate professor of geology and mineralogy in Northwestern University, has terminated his duties as assisting director in technical matters, Bureau of Oil Conservation, Oil Division, U. S. Fuel Administration, and accepted the appointment of curator in the Division of Mineral Technology, U. S. National Museum, where he will carry on educational work and investigations in industrial economics with special reference to the mineral industries.

Forrest E. Kempton, who took his Ph.D. degree at Illinois last spring and who was employed as plant pathologist in the Porto Rico Agriculture Experiment Station during part of the past year, is now employed by the U. S. Department of Agriculture Office of Cereal Investigations at the University of Illinois in connection with Barberry eradication.

J. B. Norton, of the Bureau of Plant Industry, who has been appointed agricultural explorer in the Office of Foreign Seed and Plant Introduction, has left Washington on an expedition to China.

Mr. M. B. Long, of the gas laboratory of the Bureau of Standards, has resigned in order to accept a position in the research laboratory of the Western Electric Company, in New York City.

Wishing to establish a Pasteur Institute, the government of Nicaragua has asked the Mexican government to send, at its expense, a person to establish one at Managua. In compliance with this request, the Mexican authorities have intrusted Dr. G. Leal with this duty, and he will depart shortly with the necessary personnel and equipment. As a courtesy to a sister republic, the Mexican government will bear the expenses connected with the trip.

The board of trustees of the American Medical Association has elected to the editorial staff of the *Archives of Internal Medicine,* Dr. George Dock, St. Louis; to the editorial staff of the *American Journal of Diseases of Children,* Dr. L. Emmett Holt, New York, and Dr. H. F. Helmholz, vice Dr. Frank Churchill, resigned because of removal from Chicago; on the Council of Pharmacy and Chemistry, Drs. C. L. Alsberg, Washington, D. C., Henry Kraemer, Ann Arbor, Mich., and John Howland, Baltimore, each to serve for five years; and Dr. W. W. Palmer, New York, to fill the vacancy caused by the death of Dr. J. W. Long, for a term extending to 1922.

At the recent meeting of the American Association of Anatomists, held in Pittsburgh, the following resolution was introduced and unanimously adopted: "The American Association of Anatomists expresses to Professor J. McKeen Cattell its grateful appreciation of the ability and unfailing devotion to scientific progress shown in his editorship of Science and other scientific journals, which, while serving other broader purposes, have been so often of direct benefit to anatomists."

DR. LIBERTY HYDE BAILEY, of Cornell University, will deliver the commencement address at the Kansas State Agricultural College.

THE Silvanus Thompson Memorial Lecture of the British Röntgen Society was delivered by Professor W. M. Bayliss, at the Royal Society of Medicine on May 6.

WILLIAM H. HALE, former superintendent of public baths of the City of New York, died on May 2, at the age of seventy-nine years. Dr. Hale became a member of the American Association for the Advancement of Science in 1874 and was a constant attendant at its meetings which he reported for journals and the press.

THE professor of physiology of the School of Medicine of the University of Buenos Aires, Dr. H. G. Piñero, died recently at Mar del Plata.

MR. GEORGE EASTMAN, president of the Eastman Kodak Company, has provided the Dental Dispensary at Rochester, N. Y., with an endowment of $1,000,000. The object of the institution is to provide dental work for the city's school children.

THE third Tuberculosis Sanitorium of the Virginia State Board of Health is now being designed. It will be situated at Charlottesville. In conducting it the State Board of Health will affiliate with the Medical School of the University of Virginia. According to the plan the students from the school and the nurses from the University Hospital Training School will have regular periods of service in the sanatorium. The sanatorium with one hundred beds or more will open next autumn.

THE Utah Experiment Station has received a special $20,000 appropriation from the state legislature for experimental work on underground water development. Investigations conducted by the Experiment Station and the U. S. Department of Agriculture show that vast areas of land in the southwestern part of the state contain sufficient underground water for irrigation. The experimental work to be done under this appropriation will be to determine the best type of well and equipment for various sections of the state. One well is now being driven in Iron County and others will be started in different sections of the state soon.

EPSILON chapter of Sigma Gamma Epsilon has been installed recently at the University of Missouri. This is a professional fraternity for those in geology, mining and metallurgy.

M. ALBERT SARRAUT, governor-general of Indo-China, recently announced the establishment of a scientific institute at Saigon, to study the development and utilization of the products of the soil and of the water of Indo-China. An inventory will be made of the natural resources of Indo-China, and the institute will aim to exploit them properly by means of laboratory studies, experimental research and scientific explorations.

THE *Journal* of the American Medical Association states that the National Association for the Study of Tuberculosis has recently granted $10,000 for an exhaustive scientific study to be made in Baltimore of the underlying causes of tuberculosis, under the direction of a committee consisting of Dr. Henry Barton Jacobs, Baltimore, president of the Maryland Association for the Study and Prevention of Tuberculosis; Dr. Raymond Pearl, professor of biometry and vital statistics in the School of Hygiene and Public Health, Johns Hopkins University, and Dr. William T. Howard, Baltimore, assistant commissioner of health. The grant is intended to defray the expense of the investigation and study for a year and the start will be made as soon as the necessary force of investigators can be organized. Baltimore city makes an annual appropriation of $30,000 to the health department for its tuberculosis work, and yet little progress has been made toward the reduction of the death rate. This is because the department has been unable to make its investigation as far reaching and as effective as the officials in charge have felt that the situation demanded.

THROUGH the aid of a grant made by the Research Committee of the American Medical Association, Roy L. Moodie, assistant professor of anatomy in the University of Illinois, re-

cently spent three weeks studying evidences of paleopathology in the principal paleontological museums of the eastern cities. The result is a number of observations which it is hoped will be of assistance in an understanding of ancient diseases. It was found, for instance, that the coalescence of the vertebræ of the huge dinosaurs is caused by the lesions of *Spondylitis deformans,* a common result of disease among Pleistocene vertebrates, in the ancient Egyptians and in modern man, and not previously known to occur before the Miocene. A large, fractured humerus of a Cretaceous dinosaur presents an interesting subperiosteal abscess, which is of considerable interest in connection with the study of comminuted fractures of limb bones in certain victims of the recent war.

Miss Maud Margaret Gibson has placed in the hands of the Royal Society of Medicine a sum of money sufficient to provide a scholarship of the yearly value of about £250, in memory of her father, the late Mr. William Gibson of Melbourne, Australia. The scholarship will be awarded from time to time to qualified medical women who are subjects of the British Empire. It is tenable for a period of two years, but may in special circumstances be extended to a third year.

UNIVERSITY AND EDUCATIONAL NEWS

The trustees of Wesleyan University have decided to start a campaign to secure an additional endowment of $2,000,000 for the university. The trustees have voted to make substantial increases in salaries of members of the faculty.

Queen's University, Kingston, Ontario, reports that an additional endowment of $1,000,000 has been received for the general purposes of the university. It is proposed that several more full-time professors will be secured and the departments of physiology, bacteriology and public health will be developed. A fund of $200,000 is also available to be expended in the reconstruction of the hospital.

At the University of Virginia, the school of analytical and industrial chemistry and the school of chemistry have been merged in one. Its affairs will be managed by a committee of the chemical faculty. The following new appointments are announced: Dr. Graham Edgar, of the National Research Council, with the rank of professor, and Mr. J. H. Yoe, of the Chemical Warfare Service, with the rank of adjunct professor. The staff of assistants has been enlarged considerably. Five new research fellowships have been established by the board of visitors. Applications for these should be filed with Dr. George L. Carter, secretary of the chemical faculty.

Professor Edward C. Schneider (Yale, '01), of Colorado College, has been elected head of the department of biology at Wesleyan University.

Dr. M. G. Gaba, of Cornell University, has been appointed associate professor of mathematics at the University of Nebraska.

Colonel William Darrach has been appointed dean of the College of Physicians and Surgeons by the trustees of Columbia University. He succeeds Dr. Samuel W. Lambert, whose resignation takes effect on July 1. Appointments and promotions at the college are announced as follows: William E. Studdiford, M.D., professor of obstetrics and gynecology, to succeed the late Dr. Edwin B. Cragin; Allen O. Whipple, M.D., now associate in surgery, to be assistant professor of pathology; Benjamin P. Farrell, instructor in orthopedic surgery, to be assistant professor in the same branch; Louis Cassamajor, associate professor of neurology, to be professor of neurology; Oliver S. Strong, Ph.D., assistant professor of neurology, to be associate professor of neurology.

DISCUSSION AND CORRESPONDENCE

AN IMMUNE VARIETY OF SUGAR CANE

Several years ago a serious disease of sugar cane appeared in Porto Rico. Owing to certain characters exhibited by this disease it was designated as the mottling disease of sugar cane (sometimes called mosaic). It may

be identical with the yellow stripe disease prevalent in Java and some other cane countries. At the request of the Porto Rican authorities the U. S. Department of Agriculture entered into cooperation with the insular and federal stations on the island, and Professor F. S. Earle, of the Office of Sugar-Plant Investigations, Bureau of Plant Industry, was detailed to take up the cooperative work in Porto Rico in August, 1918.

Among other lines of investigation Professor Earle studied very closely the sugar cane varieties growing in Porto Rico. He noted that among about twenty varieties growing at the federal station at Mayaguez there was one Japanese variety (Kavangire) showed no sign of the mottling disease, while all the other varieties there were more or less seriously affected. In order to carry this study further Professor Earle, through the kind cooperation of Russell & Co., inaugurated an experiment with ninety varieties of cane on their Santa Rita Estate. These varieties were planted and grown under the personal supervision of Russell & Co.'s cane planting expert, Mr. H. Bourne of Barbados. Single rows of cane were planted of the varieties to be tested, and every third row was planted with diseased seed of the Rayada variety (ribbon cane). In this way each variety was uniformly and completely exposed to the infection.

The first planting of the ninety varieties was made on October 1, 1918. Two and one half months later Mr. Bourne reported that all of the varieties except the Kavangire showed the mottling disease, the infection running from 9 per cent. to 96 per cent. This variety has remained free from disease to date, March, 1919, and shows every indication thus far of being immune to the mottling disease.

On January 29 of this year Professor Earle made a careful study of the experiment and found about half of the other varieties in this experiment showing an infection of fully 100 per cent., and in only two cases was it as low as 50 per cent. The degree of infection, however, was decidedly marked in different varieties, a few of them showing the disease but slightly, indicating that they are resistant though not immune, with the exception of the one variety Kavangire which appears to be entirely immune. In three or four of the least infected kinds close observation is necessary to detect the disease, the only evidence being very faint "watered silk" discolorations. Professor Earle has observed the Kavangire fully matured on the federal station at Mayaguez and in other localities, and in all of the localities in Porto Rico where it is growing it is entirely free from the mottling disease whether the plants are young shoots or mature canes.

The Kavangire cane is tall-growing and very slender, while the Porto Rican planter prefers a thick cane, because it appears to be a better yielder and is handled at less expense. However, the yield of the Kavangire under some conditions at least compares favorably with other varieties, and very greatly exceeding them in some cases. Director May reports a yield at the rate of 70 tons per acre on the Mayaguez plot. No analyses of the Kavangire variety, as grown in Porto Rico, are available, but according to some reports from other countries where it is grown it varies from 14.38 per cent. sucrose to 16.85 per cent. sucrose, while its purity coefficient varies from 84.6 to 89.67.

The Kavangire cane was imported into Porto Rico from the Argentine a few years ago by Mr. May, director of the Federal Experiment Station at Mayaguez. In Argentine it has been planted quite largely on a commercial scale indicating that it is satisfactory from the standpoint of sugar production. It requires a long season for maturity, and for this reason has not been recommended for general planting in Argentine. The sugar per acre is the crucial test, and in this respect the Kavangire generally stands near the top, so far as available records indicate.

After reviewing the available literature in regard to Kavangire Professor Earle raises the practical question as to whether or not Kavangire can be successfully used for general planting in Porto Rico. If it can and it retains its immune characteristic the question of combating the mottling disease is solved.

This question of the practicability of using the Kavangire is now under consideration by Professor Earle and his co-workers in Porto Rico, and at the same time further observations will be made upon the immunity of this variety to the mottling disease. Unfortunately, the available supply of plant cane of Kavangire in Porto Rico is limited. It will take a number of years to propagate enough of this variety to make it available for general planting. In the meantime its adaptability to the Porto Rican climatic and labor conditions will be determined. It appears to be a strong ratooner and to have considerable resistance to root disease, borer and stem rot. If these indications prove true Kavangire should enable the grower to keep his fields in profitable production longer without replanting than is possible with the varieties now in general use. This will reduce the cost of production, even though the habit of growth and quality of the cane should make it a somewhat more expensive variety to handle and to mill.

C. O. Townsend
U. S. Department of Agriculture

THE USE OF POISON GAS

To the Editor of Science: In regard to the article on "Poison Gases" by Major West, in your issue of May 2, 1919, the statement on p. 415 that at the Hague Conference of 1899 "the governments represented—and all the warring powers of the present great conflict were represented—pledged themselves not to use any projectiles whose only object was to give out suffocating or poisonous gases" is not correct. Twenty-six nations voted on the question, all but two being in the affirmative. The dissenting two were Great Britain and the United States. At the conference of 1907, Great Britain gave way and signed, but the United States refused. The reasons for the action of the United States are set forth clearly and, in my opinion, unanswerably by Admiral Mahan, the leader of the U. S. delegation, in a formal statement that he made on the occasion.

Henry Leffmann
Philadelphia, Pa.

SCIENTIFIC BOOKS

RENAISSANCE ANATOMY

Among the interesting papers published in "Studies in the History and Method of Science," edited by Charles Singer, and printed in Oxford by the Clarendon Press, 1917, is an important contribution of fundamental interest to students of the history of anatomy. The entire series of essays has been previously reviewed by Dr. Charles Dana[1] and we may confine our attention to Dr. Singer's "Study in Early Renaissance Anatomy," which occupies 84 pages of the book.

This study is subdivided:

I. Anatomy in the Fourteenth and Fifteenth Centuries.
II. Bolognese Works on Anatomy.
III. Hieronymo Manfredi, Professor at Bologna, 1463–93.
IV. The Manuscript *Anatomy* of Manfredi.
V. Translation of selected Passages from the Anothomia, with Commentary.
  (*a*) The Brain, Cranial Nerves, etc.
  (*b*) The Eye.
  (*c*) The Heart.
Italian Text of the Anothomia.

There is little that is new in the first two sections, although there is much interesting material, accompanied by a wealth of bibliographic details which will save the worker in anatomical history much time and labor. The discussion is interesting and instructive; the illustrations, which are well reproduced, having been chosen from the works of such early writers as Henri de Mondeville (1314), Bartholomæus Anglicus (1482), Guy de Chauliac (1430?), Mondina (1493), Ketham (1495) and many other writers. Many of these illustrations have been previously given by Locy,[2] Sudhoff,[3] Choulant[4] and others.

[1] *Annals of Medical History*, I., no. 4, 1917 (issued February, 1919).

[2] "Anatomical Illustrations before Vesalius," *Jour. Morphol.*, 1911, XXII., no. 4.

[3] "Ein Beitrag zur Geschichte der Anatomie im Mittelalter," Leipzig, 1908.

[4] "Geschichte der anatomischen Abbildungen," Leipzig, 1852.

He refers in an interesting way to the tangled triangle between Leonardo da Vinci, Vesalius and Marc Antonio della Torre (1473–1506) which has been discussed extensively by McMurrich, Forster and others. Singer speaks of the "projected treatise of Marcantonio della Torre" which was to be prepared in conjunction with Leonardo, giving an interesting reference[5] to support his conclusion. Elsewhere he says: "Leonardo da Vinci's . . . anatomical researches were without influence, and remained long unnoticed," thus casting doubt on the supposition that these illustrations had influenced the work of Vesalius.

The short biographical sketch of Hieronymo Manfredi (1430–1493) is without particular interest and is doubtless duplicated in all essentials many times in the biographical sketches given in the "Biographie Médicale" and in the biographical dictionary of Gurlt and Hirsch which is largely based in the "Biographie Médicale."

Manfredi's anatomical views were modified by the astrological learning so prominent in Bologna at that time. The matter of greatest interest about his "Anothomia" however is that it represents the breaking away from the old Galenic anatomy, which was based on calves, dogs and other mammals, and applied without question to man. Manfredi's anatomy, while only a compilation, it is true, is yet based on a careful study of many writers. "It is in the main a rearranged and on the whole improved Mondino, but amplified by reference to translations from Galen, Rhazes, Haly Abbas and Avicenna."

Perhaps other writers were also used. It is not an original work, not yet a piece of research, although he had confirmed some of his descriptions by actual dissection. However, "It is perhaps the first complete treatise on its subject written originally in the vernacular," and represents anatomy as taught at Bologna at the end of the fifteenth century.

The translations of portions of the text, made by A. Mildred Westland, are interesting and instructive. Manfredi's discussion of the scalp, skull and meninges reads remarkably like a modern text-book of anatomy, the medieval terms *almochatim* and *lauda* being no worse than those of the BNA.

It may be interesting to give Manfredi's discussion of the chorioid plexus, which recalls, in a way the ideas held later by Descartes and Swedenborg, concerning the pineal body.

> To the side . . . is another thing like a subterranean worm, red as blood, yet tethered by certain ligaments and nervelets. And this worm when it lengthens itself closes these passages, and thus blocks the path between the first ventricle and the second. Nature has wrought it thus, so that when a man wills he may cease from cogitation and thought; and similarly when, on the other hand, he would think and contemplate, this worm contracts itself again and opens these passages and thus frees the way between one ventricle and another.

Manfredi gives the customary six cranial nerves, all that were known to the ancients. His discussion of the anatomy of the eye shows the strong influence of the Arabians who were excellent ophthalmologists, while his description of the heart follows closely that of Mondino.

In the opinion of the reviewer there have been few studies of more fundamental importance to the study of anatomical history than the present one by Dr. Singer. Sudhoff's study already referred to, the studies of Stieda, Toply and Jastrow on the "Beginnings of Anatomy" among the ancient Chaldeans, Babylonians and Romans are to be mentioned in this connection. Important contributions to anatomical history are difficult to produce, since it requires great linguistic ability, access to large collections of manuscripts and books, and some knowledge of anatomical structure. Such a combination, rare and difficult as it is, is found in the person of Dr. Charles Singer who is doing notable work in the advancement of knowledge of ancient medical literature through

[5] G. Cervetto, "Di alcuni illustri anatomici italiani del decimoquinto secolo," p. 46, Verona, 1842.

the publications at Oxford University, and in the pages of the *Annals of Medical History*.

Roy L. Moodie

University of Illinois,
College of Medicine

SPECIAL ARTICLES

NOTES ON CERTAIN CONGLOMERATIC STRUCTURES IN LIMESTONES IN CENTRAL PENNSYLVANIA

The following notes may be of value to those interested in the origin of limestone conglomerates in the Nittany valley, Pennsylvania.

Last summer while collecting extensively from the Stonehenge and Axemann limestones, fossiliferous members of the Beekmantown series, in the Bellefonte quadrangle the writer found repeated occurrences of fossils in the conglomeratic, or pseudo-conglomeratic beds. In some cases the fossils were sparingly disseminated among structures prevailingly conglomeratic and apparently of inorganic origin. In other instances fossil layers themselves assumed a conglomeratic appearance in cross-section, especially if slightly weathered. It was often impossible to determine in the field whether a structure, apparently conglomeratic, owed its superficial appearance to a strictly inorganic origin or rather to an assemblage of fossils in a more or less clastic fashion. Gradually the impression grew upon the observer that fossils worked over mechanically in some way prior to burial formed the basis of some of the so-called limestone conglomerates. Anent this possible method of formation the following observation is offered for what it is worth.

Several years ago the writer had occasion to collect fossils from the Warrior limestone (Buffalo Run limestone of Moore and Walcott) of Upper Cambrian age and found one outcrop which could be interpreted as the result of the mechanical breaking up of an organism. A small reef or cluster of *Cryptozoon*, seen in cross-section, appeared broken or flaked off in such a manner that the cemented rubble much resembled "edgewise" conglomerate. The area on the rock surface was small, but the occurrence is deemed significant.

Caution should be used by the field worker in interpreting probable conglomeratic structures in these limestones, as a cross-sectional view alone may be misleading unless the possibility of fossils is constantly kept in mind.

The paper by Mr. Richard M. Field[1] on these obscure structures deserves commendation. His many field observations and summary of previous literature render the work a distant contribution to knowledge whether or not one agrees with his theory of origin. The reader is referred to this paper for a full treatment of the subject.

Harry N. Eaton

Syracuse University

MINUTES OF THE COMMITTEE ON POLICY OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The Committee on Policy met on Monday, April 28, 1919, at 5 P.M., at the Cosmos Club, with Mr. Nichols in the chair, and Messrs. Woodward, Merriam, Humphreys, MacDougal, Cattell, Noyes, Ward and Howard also present.

On motion, Professor Dimon Kellogg, of Columbia, Mo., was elected to membership, made a fellow and, on nomination from the sectional committee of Section A, was elected vice-president and chairman of that section.

On motion, Dr. David Jayne Hill, was elected to membership, made a fellow and, on nomination from the sectional committee of Section I, was elected vice-president and chairman of that section.

On motion, Dr. C. Kenneth Leith, of Madison, having been nominated by the sectional committee of Section E, was elected as vice-president and chairman of that section.

On motion, A. S. Langsdorf, of Washington University, was elected as secretary of the council in place of Dr. J. F. Abbott, resigned.

[1] "A Preliminary Paper on the Origin and Classification of Intraformational Conglomerates and Breccias," Richard M. Field, *Ottawa Naturalist*, vol. 30, nos. 2–6, May–Sept., 1916, pp. 29–36, 47–52, 58–66.

A communication from Dr. Felix Neumann, of the Surgeon General's Library, suggesting a change in the last constitution in the name of Section K from Historical and Philological Sciences to History of Science was read, and, on motion, the secretary was instructed to inform Dr. Neumann that this idea could be embodied in an amendment to the constitution to be submitted at the St. Louis meeting, if desirable, or that members interested in the history of science could form a sub-section of Section K provided the name as previously recommended for the section should be adopted.

The following fellows were elected as honorary fellows emeritus under the terms of the Jane M. Smith Fund: Charles Frederick Chandler, Edward Williams Morley, William North Rice and Albert Henry Tuttle.

On motion, the treasurer was authorized to invest two thousand dollars in Victory Liberty Notes.

Reports of progress with regard to the proposed popular journal were made by Mr. Humphreys and Mr. Noyes. After a lengthy discussion on the proposal for a new scientific journal under the partial auspices of the American Association for the Advancement of Science, it was agreed it would be equitable to enter into arrangements provided that SCIENCE be offered to members for the three dollar fee; that the new popular journal or *The Scientific Monthly* be offered for four dollars; that SCIENCE and the new popular journal be offered for six dollars, and that all three publications be offered for nine dollars, and that SCIENCE be underwritten for its circulation through the American Association for the Advancement of Science on the amount of its subscriptions at the time of the establishment of the new journal; or that SCIENCE be paid fifty cents for each individual subscription between the actual subscriptions and the circulation at the time mentioned, the same to be deducted from the amount paid by the association to the new journal.

Dr. Ward reported from the committee on state and local academies, giving the results of preliminary negotiations with three state academies.

On motion, it was resolved that state and city academies of science may become associated or affiliated with the association by paying to the association only two dollars and fifty cents for each member, retaining fifty cents of the association fee for the use of the academy, and the entrance fee of the association of five dollars shall be remitted in such cases.

Mr. Cattell made a progress report with regard to the National Education Association.

On motion, Messrs. MacDougal, Coulter and B. M. Duggar were appointed a special committee to confer with the secretaries of societies of botanical interests which meet with the association to consider the coordination of the efforts of such societies.

On motion, the opinion of the committee on policy was expressed that, when the new journal on popular science is established, the entrance fee of the association should be remitted for one year.

At 10.30 P.M., the committee adjourned.

L. O. HOWARD,
Permanent Secretary

THE UTAH ACADEMY OF SCIENCES

THE twelfth annual convention of the Utah Academy of Sciences was held at Salt Lake City, April 4 and 5, 1919, in the physics lecture room of the University of Utah.

In all, three sessions were held—the first beginning at 8 o'clock Friday evening, the second at 9:30 o'clock Saturday morning, and the closing session at 2 o'clock Saturday afternoon.

At the business meeting Saturday afternoon, five members were elected to fellowship as follows: Dr. M. C. Merrill, Dr. Willard Gardner, Harold R. Hagan and Tracy H. Abell, of the Utah Agricultural College, Dr. Joseph F. Merrill, of the University of Utah.

The following persons were elected to membership in the Academy: Professor A. L. Beeley and Professor LeRoy Cowles, of the University of Utah, D. W. Pittman, of the Utah Agricultural College, Mark Anderson, of the U. S. Forestry Service, and Andrew Lee Christensen, Salt Lake City.

Dr. W. C. Ebaugh, formerly head of the department of chemistry at the University of Utah, having permanently removed from the state, was transferred to associate membership.

The constitution was amended in several particulars relating principally to the admission of new members. The office of corresponding secretary was created.

The following officers were elected for the ensuing year: *President*—Dr. Orin Tugman, University of Utah; *First Vice-president*—C. F. Korstian, U. S. Forestry Service, Ogden, Utah; *Second Vice-president*—Dr. Frank L. West, Utah Agricultural College, Logan; *Permanent Secretary-Treasurer*—A. O. Garrett, East High School, Salt Lake City; *Corresponding Secretary*—C. Arthur Smith, East High School, Salt Lake City; *Councillors-at-large*—Dr. W. D. Bonner, U. of U., Salt Lake City; Professor Hyrum Schneider, U. of U., Salt Lake City, and Dr. Newton Miller, U. of U., Salt Lake City.

The following papers were read at the convention:

Harold R. Hagan, Utah Agricultural College, Logan, "A history of entomology to 1800."

Mark Anderson, Forest Service, Ogden, "Detection of overgrazing by indicator plants."

Professor A. L. Beeley, Utah University, Salt Lake City, "The problem of handedness."

Professor Tracy H. Abell, Utah Agricultural College, Logan, "Investigations in dehydration."

Dr. M. C. Merrill, Utah Agricultural College, Logan, "Distilled water as a medium for growing plants."

Dr. Frank L. West, Utah Agricultural College, Logan, "Determination of probable temperature at a particular place for a definite hour on a definite day."

Dr. F. S. Harris and N. I. Butt, Utah Agricultural College, Logan, "Alkali water for irrigation."

Professor D. W. Pittman, Utah Agricultural College, Logan, "The relation of the method of analyzing alkali soils to the limit of toxicity."

Dr. Willard Gardner, Utah Agricultural College, Logan, "A theory of capillary flow."

Dr. Joseph F. Merrill, Utah University, Salt Lake City, "Is electric air heating feasible?"

Dr. W. D. Bonner, Utah University, Salt Lake City, "Atoms and the atomic theory."

C. F. Korstian, Forest Service, Ogden, "Evaporation and soil moisture in relation to forest planting."

C. Arthur Smith,
Corresponding Secretary

THE KANSAS ACADEMY OF SCIENCE

The fifty-first annual meeting of the Kansas Academy of Science was held at the State Agricultural College, Manhattan, April 18 and 19. There was in attendance an excellent representation of the scientists of the educational institutions, scientific professions and industries of the state.

"The cultivation of medicinal plants in the United States," illustrated, was the subject of the presidential address, by Professor L. D. Havenhill, of Kansas University.

Professor Henry B. Ward, of the University of Illinois, the visiting scientist, delivered two lectures, one on "The conservation of our aquatic resources," and the other on "Research and reconstruction," the latter to the faculty, students and friends of the college as well.

President W. M. Jardine addressed the academy on the problems and aims of the Kansas Agricultural Experiment Station, and described some of the projects under way.

Sixty-one papers were presented, either by title or read, most of them reports of progress and accomplishment in research.

A banquet was served during the evening of the eighteenth which was attended by more than one hundred persons. Dean L. E. Sayre, of Kansas University, was toastmaster, and talks were made by President Jardine, Professor Ward, Major E. L. Holton, of the Red Cross, and Representative Hughbanks, of the Kansas legislature.

The academy formally voted to accept the invitation to affiliate itself with the American Association for the Advancement of Science according to the plan previously published in Science.

Dr. Robert K. Nabours, of the Agricultural College, and Dr. B. M. Allen, of Kansas University, were elected president and first vice-president, respectively, for the coming year.

E. A. White,
Secretary

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